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PUBLIC UTILITIES COMMISSION

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Concord, N.H. 03301-7319

## New Hampshire Residential Energy Code

This booklet contains the *Application for Certificate of Compliance* for the New Hampshire Energy Code for new residential and small commercial structures. **Please read these directions!** If you still need further help please call us for assistance.

**You must obtain certification** if you plan to:

- Build a new home with any provision at all for fossil or electric heat
- Construct a commercial structure under 4000 square feet
- Plan to spend more than 50% of the current value of the structure altering a structure
- Winterize a seasonal home or part of an existing structure, such as finishing a room over a garage
- Construct an addition with more than 150 square feet of total floor space

**You may be exempt** if you are:

- Siting a mobile home
- Siting a modular home certified by the NH Modular Home Program. Contact the Office of the Fire Marshall at 603 271-3294 for details.
- Making no provision for electric or fossil fuel heat
- Renovating or adding to a certified historic building

In municipalities with a building code, deal directly with your building inspector; otherwise submit this completed application to the Public Utilities Commission.

If your structure has been designed by a NH architect or engineer, he or she has the responsibility of certifying your construction plans and submitting a letter to the PUC and the town stating that the structure meets the code requirements. If he or she has done so, **stop here**. You do not have to submit this application.

**Filling out the Application** Here are the basic steps to submitting a complete application:

1. **Fill out the application form** on page 3 of this booklet. If you believe your project is exempt, complete Boxes 1, 2 and 3, sign, date and return the application. (If you are building an addition 150 square feet or larger, turn directly to page 7, and use the Performance Package entitled "ADDITION". You don't have to do any calculations or produce a drawing or window list. **Stop here** and sign and return pages 3 and 6.)
2. **Draw the basic outline of your structure** on page 4 of this booklet, or attach drawings or plans. If there are cathedral ceilings or finished attic space please include elevation (side view) drawings as well.
3. **Use the Area Calculation Worksheet** on page 5 of this booklet to help calculate areas, if you want to. If you are using the Performance Packages, you don't have to use the grey boxes. Filling in the grey areas will only help you if you are using the NHcheck software.
4. Include the dimensions, quantity, U-values, and brand names of your windows, skylights and glazed doors. **U-values must be NFRC listed.** If a listing is not available use the appropriate values from the *Default Tables* on page 7. Use the rough opening dimensions for all windows, skylights, and doors with more than 50% glass. In doors that are less than half glass, count only the glass area.

5. Above Grade Wall area includes all vertical walls surrounding conditioned space, and includes basement walls which are more than 50% above grade if the basement is to be conditioned. **Please note:** sloped ceilings are not considered walls under this code unless they are at a 60° or steeper angle.
6. There are two easy methods to demonstrate that your planned structure meets the code: the Performance Package Worksheet or the *NHcheck* software. You can use either one; the directions for each are found below. (You can also use *MECcheck* software if you set it to “New Hampshire” “Concord”).
7. **Note:** you must meet the *Basic Requirements* whether you use a Performance Package or the *NHcheck* software. A summary of the Basic Requirements is found on page 8 of this booklet.

### Performance Package Approach

This is the easiest way to show compliance with the code. The worksheet is on page 6 of this booklet:

1. **Fill in the project information** at the top of the worksheet.
2. **Calculate your glazing percentage** in the section titled *Glazing Area*. (Not required for additions.)
3. **Examine the Performance Packages** on page 7. You can choose any package in which the *Maximum Glazing Percentage* shown in the top row is equal to or greater than your glazing percentage. If you are building an addition, or log structure, choose a package with the appropriate label.
4. **From the eligible packages, select the one which best matches your preferences**, and write the package name in on page 6. You must meet all of the applicable requirements in the selected package, but you should ignore requirements for building components not present in your structure. For example, if you plan to insulate the “Floor over Unconditioned Space”, you can ignore the requirements for basement and crawlspace walls, and slab edge insulation. Of course, you may wish to insulate those areas anyhow. Note: the Packages are organized around the maximum allowed glazing percentage and then window U-values (lower is better).
5. **Complete the rest of the Performance Package Sheet** using the information from your selected package. Copy the U and R-values from the package you have selected onto the center section; and write in the values you intend to use in your planned building on the right side. **Note: Your Planned U-values must equal or be less than the package U-values and your Planned R-values must equal or be greater than the package R-values.**
6. **Mail the completed application** to the PUC, or return it directly to your building inspector if your town has a building code. It’s a good idea to make a copy, or at least keep the back page for reference.

### NHcheck Software Approach

There are several situations when you will want to use the *NHcheck* software:

- If your planned building does not easily comply with any of the performance packages.
- If you are building with metal-framed or masonry exterior walls, or more than 25% glazing percentage.
- If you wish to trade off among efficiency technologies to minimize your building’s energy use at the lowest cost.

This Windows-based software is available from the PUC, or on the Internet at [www.puc.state.nh.us](http://www.puc.state.nh.us). Fill out the “Optional Information” page with your name, etc. Then use the buttons at the top to select individual building components. Enter the *net* areas of all applicable components, but do not input components that do not apply. For example, if you are insulating the walls of a conditioned basement, do not enter the floor over the basement. You are not limited to only one entry for each component. For example, if you have windows with different U-values you may enter them as separate “Glazing” components. Choose the combination of insulation levels, glazing U-values, and heating system which best meet your needs while still passing. **Use the F1 key for additional detail.** Print out the report, sign it and return it to the appropriate authority along with page 3, a drawing of the building (maybe page 4) and a list of the window and glass door sizes and U-values (you may use page 5).

If you do not have access to a personal computer, one may be available for your use at a building supply store or town library. Other compliance tools are available from the PUC. They are more complex, and should be used only if the Performance Packages do not work and the software is unavailable; or if your planned structure uses advanced energy-saving technologies that cannot be demonstrated by the other methods.

This is not a difficult process. Please use your best judgement when filling out the application **but do not hesitate to call us at the PUC: (603) 271-6306** if you need some advice or direction.

# NEW HAMPSHIRE ENERGY CODE APPLICATION FOR CERTIFICATION OF COMPLIANCE

Residential / Small Commercial

*Please Print*

<b>1. Owner / Owner-Builder:</b> (mandatory)		
Name:		
Mail Address:		
City:	State:	Zip:
Phone:		

<b>2. General Contractor:</b> (if applicable)		
Name:		
Mail Address:		
City:	State:	Zip:
Phone:		

<b>3. Proposed Structure:</b> (mandatory) Map: Lot:
Street:
City:
1 or 2 Family <input type="checkbox"/> Multi-Family <input type="checkbox"/> Commercial <input type="checkbox"/> Modular <input type="checkbox"/> Mobile Home <input type="checkbox"/> Addition <input type="checkbox"/> total floor space _____ft <sup>2</sup> Exempt? <input type="checkbox"/> Why? _____ <small>If mobile home, modular certified by NH Modular Home Program, or addition 150 ft<sup>2</sup> or under, structure may be exempt. Sign &amp; mail form to PUC or town.</small>
<b>Basement:</b> Heated: <input type="checkbox"/> or Unheated: <input type="checkbox"/> Walk-out: <input type="checkbox"/> Full: <input type="checkbox"/> or Crawl Space: <input type="checkbox"/> or Open: <input type="checkbox"/> or Slab: <input type="checkbox"/>

<b>Official Use Only:</b> Date Received:	
Approved by:	Date:
Disapproved by:	Date:
Approval Number:	
Stamp:	

<b>4. Proposed Heating System:</b> (mandatory) Efficiency (AFUE): _____ % (Must match or exceed Performance Package or NHcheck report)	
Primary Fuel:	Oil: <input type="checkbox"/> or Natural Gas: <input type="checkbox"/> or LP: <input type="checkbox"/> or Wood: <input type="checkbox"/> or Electric: <input type="checkbox"/> or Other: _____
Secondary Fuel: (if applicable)	Oil: <input type="checkbox"/> or Natural Gas: <input type="checkbox"/> or LP: <input type="checkbox"/> or Wood: <input type="checkbox"/> or Electric: <input type="checkbox"/> or Other: _____
System Type: (check all that apply)	Hot Water: <input type="checkbox"/> Hot Air: <input type="checkbox"/> Stove: <input type="checkbox"/> Resistance: <input type="checkbox"/> Heat Pump: <input type="checkbox"/> Other: _____

<b>5. Proposed Domestic Hot Water System:</b> (optional) Efficiency: _____ %	
Fuel:	Oil: <input type="checkbox"/> or Natural Gas: <input type="checkbox"/> or LP: <input type="checkbox"/> or Wood: <input type="checkbox"/> or Electric: <input type="checkbox"/> or Other: _____
System Type:	Tankless off Boiler: <input type="checkbox"/> or Boiler with Storage Tank: <input type="checkbox"/> or Stand-alone Water Heater: <input type="checkbox"/>

<b>6. Windows:</b> (mandatory) U-Value: _____* Wood: <input type="checkbox"/> Vinyl: <input type="checkbox"/> Metal: <input type="checkbox"/> Metal with Thermal Break: <input type="checkbox"/>	
Brand:	Clear: <input type="checkbox"/> or Low-E: <input type="checkbox"/> or Low-E Argon: <input type="checkbox"/>

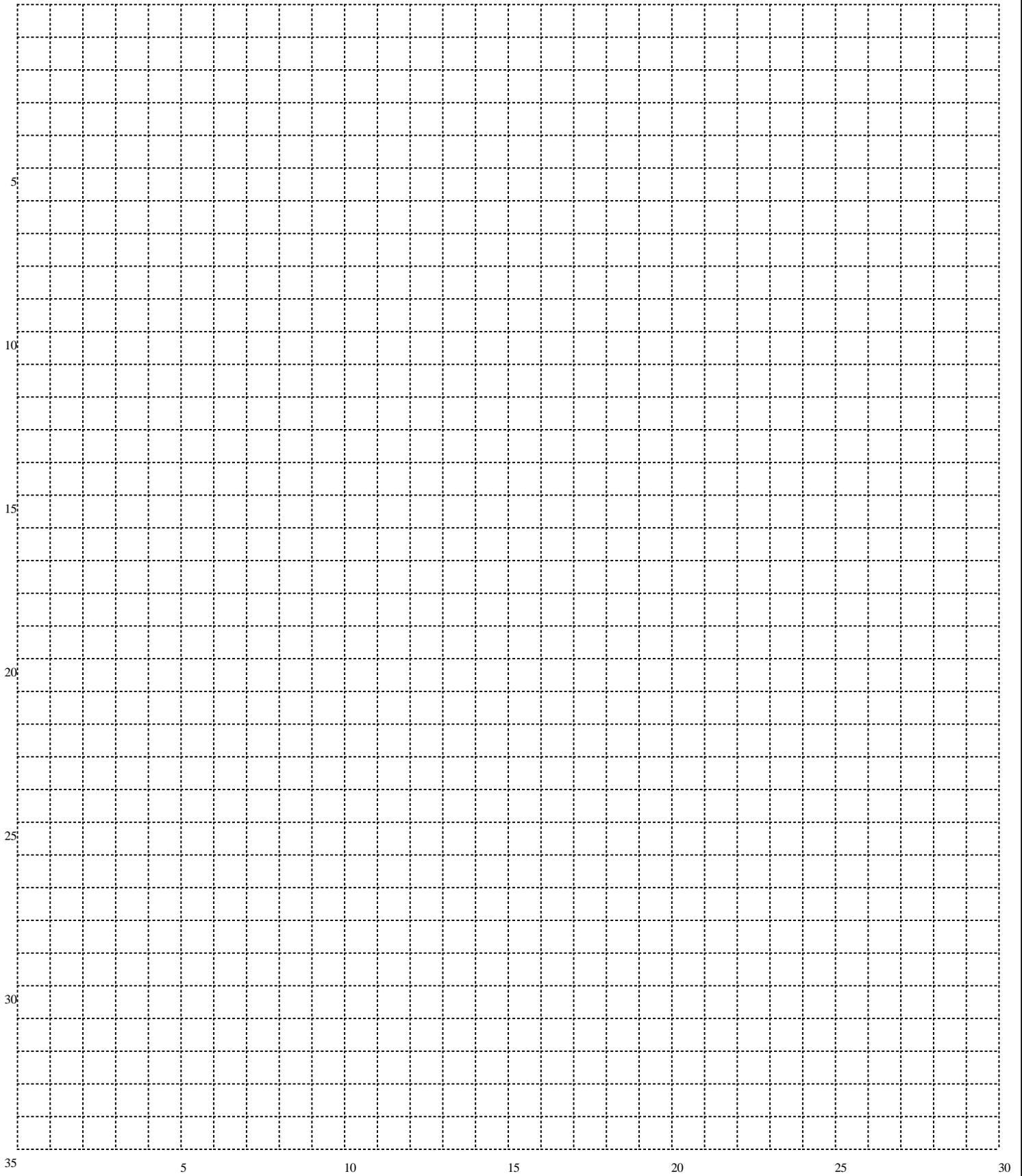
\* NFRC Rating from window label, manufacturer or product literature or from Default Tables on page 7

I hereby certify that all the information contained in this application is true and correct, and construction shall comply in all respects with the terms and specifications of the approval given by the Public Utilities Commission and with the New Hampshire Code for Energy Conservation in New Building Construction.

Signature \_\_\_\_\_ Print Name \_\_\_\_\_ Date \_\_\_\_\_

**Drawing of Structure** (Sketch floor plans with dimensions; include side view if sloped ceilings are planned.  
Note window and door locations & identify to correspond with window list.)

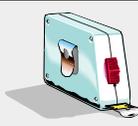
**Scale: One square equals \_\_\_\_\_ feet**



## NH ENERGY CODE AREA CALCULATION WORKSHEET

This sheet may help you calculate the areas of the structure. It's optional, but you must still supply a list of window sizes and U-values.

<b>Windows, Basement Windows in conditioned basements, Glazed Doors &amp; Skylights</b> (Use rough opening (RO) dimensions)								
	Width*	x Height*	x Number	= R O Area*	U-Value	Model	Manufacturer	
A		x	x	=				
B		x	x	=				
C		x	x	=				
D		x	x	=				
E		x	x	=				
F		x	x	=				
G		x	x	=				
H		x	x	=				
I		x	x	=				
*In Inches				Total	.0*	÷ 144=	.0	sq ft glazing area (copy to Item A p6)

<b>Above Grade Walls Surrounding Heated Space</b>										
Add lengths of walls (including basement walls more than 50% above grade if Floor (basement ceiling) is not insulated) in feet										
Floor	Front	Side 1	Back	Side 2	Total	Wall Height	Gross Wall Area	Glazing & Doors	Net Wall Area	
1st		+	+	+	=	x	=	.0	Subtract total of glazing and solid doors 	
2nd		+	+	+	=	x	=	.0		
Other		+	+	+	=	x	=	.0		
*If using Performance Package Worksheet, STOP HERE & go to page 6 (copy to Item B page 6)							.0*	-	=	.0

<b>Solid Doors</b> (Use unit or rough opening dimensions) Do not include cellar door								
	Width *	x Height *	x Number	= Door Area*	U-Value	Model	Manufacturer	
1		x	x	=				
2		x	x	=				
3		x	x	=				
*In Inches				Total	.0*	÷ 144=	.0	sq feet of solid door area

<b>Conditioned Basement Walls</b> (include only if Floor (basement ceiling) is not insulated or Basement is heated with electricity or fossil fuel) in feet							
Front	Side 1	Back	Side 2	Total	Wall Height	Gross Conditioned Basement Wall Area	
	+	+	+	=	x	=	.0

<b>Ceilings over Heated Space in feet</b>		
Length	Width	Area
	x	=
	x	=
Total		.0

<b>Floor (basement ceiling) in feet</b>		
Length	Width	Area
	x	=
	x	=
Total		.0

<b>Slab Length in feet</b>		
	+	
	+	
Total		.0

# The New Hampshire Energy Code Performance Package Sheet

Owner Name	Date
Proposed Structure Address	
Submitted by	Phone

Official Use Only
Permit #
Issued by
Date

**YOUR PLANNED GLAZING PERCENTAGE** (Not required for additions)

$$100 \times \frac{\text{Glazing Area}}{\text{Gross Wall Area}} = \text{Glazing Percentage} \% \text{ (Round to nearest \%)}$$

Item **A** (from page 5)
Item **B** (from page 5)

**PERFORMANCE PACKAGE :** \_\_\_\_\_  
(Select from page 7 based on Glazing Percentage and other characteristics meeting your needs.)

**MAXIMUM GLAZING PERCENTAGE FROM ABOVE PACKAGE:** \_\_\_\_\_ %  
(Must equal or exceed your planned glazing percentage)

BUILDING SECTION	PACKAGE REQUIREMENTS		YOUR PROPOSED STRUCTURE	
	Copy from selected PERFORMANCE PACKAGE on page 7 (You must stay in column)		Planned R or U values	Brands / Models /Types or Insulation Type & Thickness
Glazing (Smaller U-values are better)	<i>Maximum</i> U-value	0.	0.	
Heating System (Higher is better)	<i>Minimum</i> AFUE	%	%	
Cooling System (Higher is better)	<i>Minimum</i> SEER	10		
Solid Doors (1 cellar door is exempt)	<i>Maximum</i> U-value	0.35	0.	
Flat Ceiling (Higher Rs are better)	<i>Minimum</i> R-value			
Sloped Ceiling	<i>Minimum</i> R-value	R-30		
Above Grade Walls	<i>Minimum</i> R-value			
Floor over Unconditioned Space	<i>Minimum</i> R-value			
Basement Walls Below Grade	<i>Minimum</i> R-value			
Crawlspace Walls	<i>Minimum</i> R-value			
Slab Edge (exposed)	<i>Minimum</i> R-value			

Statement of Compliance: I certify that all the information contained in this application is true and correct, and construction shall comply in all respects with the terms and specifications of the approval given by the Public Utilities Commission and with the New Hampshire Code for Energy Conservation in New Building Construction.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Date

NH ENERGY CODE PERFORMANCE PACKAGES		For Wood Frame or Log Homes		Please Read Footnotes (* Indicates Continuous Foam Board Insulation)									
		Addition	Pack A	Pack B	Pack C	Pack D	Pack E	Pack F	Pack G	Pack H	Log 1	Log 2	Log 3
Maximum Glazing Percentage <sup>d</sup>		No Limit	10%	13%	13%	13%	15%	15%	18%	25%	10%	13%	18%
Maximum Glazing U-Value <sup>e</sup>		0.57	0.57	0.50	0.43	0.36	0.43	0.36	0.36	0.31	0.45	0.37	0.32
Minimum Heating System A/E/E(reduce by 2% if hot air furnace)		80%	82%	83%	84%	82%	82%	82.5%	86%	84%	84%	84%	86%
Maximum Solid Door U-Value (Cellar door exempt)		0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
Minimum Flat Ceiling R-Value <sup>e</sup>		30	38	30	38	30	38	38	38	38	38	38	38
Minimum Sloped Ceiling R-Value <sup>e</sup>		30	30	30	30	30	30	30	30	30	30	30	30
Minimum Above Grade Wall R-Value <sup>d</sup>		19	19	19	19	19	19	19	21	21	LOG	LOG	LOG
Minimum Floor (basement ceiling) R-Value <sup>d</sup>		30	19	30	19	19	30	19	19	30	30	30	30
Minimum Basement Wall R-Value <sup>e</sup>		19 or 14*	11 or 10*	18 or 14*	11 or 10*	11 or 10*	18 or 14*	11 or 10*	11 or 10*	18 or 14*	18 or 14*	18 or 14*	18 or 14*
Minimum Crawlspace Wall R-Value <sup>d</sup>		19 or 14*	5*	10*	5*	5*	10*	5*	5*	10*	10*	10*	10*
Minimum Slab Edge R-Value <sup>e</sup>		10*	5*	10*	5*	5*	10*	5*	5*	10*	10*	10*	10*

**FOOTNOTES:**

- Glazing area** is the ratio of the area of the glazing assemblies (including sliding glass doors, skylights and windows in conditioned basements but excluding solid doors) to the gross vertical wall area, expressed as a percentage.
  - Glazing U-Values** must be documented by the National Fenestration Rating Council (NFRC) or taken from the default table below. Remember: the lower the U-value the better.
  - Ceiling R-Values** do not assume raised or oversized truss construction. If the insulation achieves its full R-value over the exterior walls or is continuous such as a roof deck or built-up roof, R-30 insulation may be substituted for R-38. Ceiling R-Values are the *sum* of cavity insulation and insulating sheathing (if used). Scuttles or pull-down stairs must be insulated to at least R-10 and need not be considered if under 15 square feet.
  - Wall R-Values** are the *sum* of cavity insulation and insulating sheathing (if used). *Do not* include exterior siding, structural sheathing or interior drywall. For example, an R-19 requirement could be met with R-19 cavity insulation or R-13 cavity insulation plus R-6 insulating sheathing. Include band joists between heated floors. Metal framed walls do not meet the requirements for prescriptive packages.
  - Floor** requirements apply to floors over unconditioned basements or crawlspaces. If floors over unheated basements are to be insulated, do not consider the basement walls, windows or doors for the purposes of this code. If basement or crawlspace walls are insulated, do not include floor areas. The interior door at top or bottom of the cellar stairs is exempt from any U-value requirement. Floors over outside air must be insulated to at least R-30.
  - Walls of basement below un-insulated floors** must be insulated from the top of the rim joist to 10 feet below grade or to the bottom of the basement wall whichever is less. Basement walls less than 50% below grade *must* be considered above-grade walls and insulated accordingly. Basement windows under un-insulated floors must be included with other glazing and meet the same U-value requirements. Basement doors under un-insulated floors must have a maximum U-value of 0.35. The walls of heated basements must be insulated to the required levels and the Floor (basement ceiling) ignored. A basement is considered heated only if provision is made to heat it with fossil or electrically derived heat. *The presence of a furnace, boiler or woodstove do not make a basement "heated" under this code.*
  - Crawlspace** R-Values are for walls of unventilated crawlspaces. The insulation must extend from the top of the wall (including sill plate) to at least 12 inches below grade.
  - Slab R-values** are for slabs without embedded heating pipes and require insulation to extend a total of 48 inches down from the top of the slab and under it; a total of 48 inches down from the top of the slab and horizontally away from it covered with at least 10 inches of soil or pavement; or straight down 48" from the top of the slab. Add an additional R-2 for slabs having embedded heating pipes or un-insulated ducts.
- REMEMBER:** Glazing areas and U-Values are maximum acceptable levels. Insulation R-Values are minimum acceptable levels. The R-values listed are those of the insulation only and do not include any structural elements. If your planned design does not meet the provisions of any of the above Performance Packages, consider using the NHcheck software package available for download from [www.puc.state.nh.us](http://www.puc.state.nh.us) or from the PUC.

**WINDOW AND DOOR U-VALUE DEFAULT TABLES**

(to be used only if NFRC rating information is not available from manufacturer or window labels)

WINDOW TYPE	WOOD / VINYL		METAL CLAD WOOD		METAL WITH THERMAL BREAK		METAL WITHOUT THERMAL BREAK		STEEL DOORS		WOODEN DOORS		
	SINGLE PANE	DOUBLE PANE	SINGLE	DOUBLE	SINGLE	DOUBLE	SINGLE	DOUBLE	FOAM	HOLLOW		STORM	NO STORM
OPERABLE	0.94	0.56	0.98	0.60	1.07	0.67	1.30	0.87			WITH 7/16" PANELS	0.36	0.54
FIXED	1.04	0.57	1.05	0.58	1.11	0.63	1.17	0.69			W / 1/8" PANELS	0.28	0.39
SKYLIGHTS	1.47	0.85	1.50	0.88	1.93	1.13	2.02	1.30			HOLLOW CORE	0.32	0.46
GLASS DOORS	0.98	0.56	0.99	0.57	1.10	0.66	1.26	0.80			SOLID CORE	0.26	0.40

**New Hampshire Residential Energy Code**  
**Summary of Basic Requirements**  
(This code applies in all municipalities)

<b>Air Leakage</b>	Joints, penetrations and all other similar openings in the building envelope that are sources of air leakage must be caulked, gasketed, weatherstripped or otherwise sealed. The maximum leakage rates for manufactured windows and doors are shown on the reverse side. Recessed lights must be type IC rated and installed with no penetrations or installed in appropriate air-tight assemblies with 0.5 in clearance from insulation.
<b>Vapor Retarder</b>	Vapor retarders must be installed on the warm-in-winter side of all non-vented framed ceilings, walls and floors. In floors, exterior rated sheathing qualifies as a vapor retarder. This requirement does not apply where moisture or its freezing will not damage the building materials.
<b>Materials and Insulation Information</b>	Materials and equipment must be identified so that compliance can be determined. Manufacturer manuals for all installed heating, cooling and service water heating equipment must be provided. Insulation R-values, glazing and door U-values and heating and cooling equipment efficiency must be clearly marked on the building plans, drawings, specifications or Area Calculation Worksheet.
<b>Duct Insulation</b>	Supply <i>and</i> return ducts for heating and cooling systems located in unconditioned spaces must be insulated to at least R-3. Exceptions: Insulation is not required for exhaust air ducts, ducts within HVAC equipment or when the design temperature difference between the air in the duct and the surrounding air is 15° F or less.
<b>Duct Construction</b>	Ducts must be sealed using mastic with fibrous backing tape. For fibrous ducts, pressure-sensitive tape may be used. Other sealants may be approved by the building official. Duct tape is not permitted. The HVAC system must provide a means for balancing air and water systems.
<b>Temperature Controls</b>	Thermostats are required for each separate HVAC system in single-family buildings and each dwelling unit in multifamily buildings (non-dwelling portions of multifamily buildings must have one thermostat for each system or zone). Thermostats must have the following ranges: Heating only                    55°F to 75°F Cooling only                    70°F to 85°F Heating and Cooling        55°F to 85°F A manual or automatic means to partially restrict or shut off the heating or cooling input to each zone shall be provided for single-family homes and to each room for multifamily buildings.
<b>HVAC Piping Insulation</b>	HVAC piping in unconditioned spaces conveying fluids at temperatures above 120°F or chilled fluids at less than 55°F must be insulated to at least R-4.
<b>Heated Swimming Pools</b>	All heated swimming pools must have an on/off pool heater switch. Heated pools require a pool cover unless more than 20% of the heating energy is from renewable sources. Any swimming pool pump must be equipped with a time clock.
<b>Circulating Hot Water</b>	Circulating hot water systems must have automatic or manual controls and pipes must be insulated.
<b>Electric System</b>	Each multifamily dwelling unit must be equipped with a separate electric meter.